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ADDITIONS TO THE FAUNA OF *DRAPETIS* MEIGEN (DIPTERA: EMPIDIDAE) FROM CHINA

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Abstract.—The following three **new species** of the genus *Drapetis* Meigen (Diptera: Empididae) are described and illustrated: ***D. digitata, D. elongata***, and ***D. ventralis***. An updated key to the species of the genus from China is presented.

Key Words: Empidoidea, Empididae, Tachydromiinae, *Drapetis*, China, new species

The genus *Drapetis* Meigen, a member of the subfamily Tachydromiinae (Diptera: Empididae), is very similar to *Elaphropeza* Macquart, but can be separated from the latter by the hind tibia lacking anterodorsal setae and the usually black body (Chvála 1975, Steyskal and Knutson 1981, Yang et al. 2004). The genus is distributed worldwide, and when last cataloged, two species were known from the Oriental Region, endemic to Taiwan (Smith 1975), three from the Australasian and Oceanian regions (Smith 1989), and 20 from the Palaearctic Region (Chvála and Kovalev 1989). Ten species are presently known to occur in mainland China (Yang et al. 2004). Some other major references dealing with *Drapetis* include Collin (1961), Kovalev (1972), Chvála (1975), and Rogers (1983).

Biological information about species of *Drapetis* is scant, with general reference to adults being found scurrying on tree trunks (Kovalev 1972), or in rodent burrows and ant nests (Rogers 1983). Barták and Roháček (2000) suggested that one Palearctic species, *Drapetis infitialis* Collin, is a tyrphobiont (strictly dependent on peat bogs). Few papers specifically address the biology of this genus, but Hagler (2002) found a Nearctic species near *Drapetis divergens* Loew to be the most abundant predator of adult whiteflies (Aleyrodidae, specifically *Bemisia argentifolii* Bellows and Perring) in Arizona cotton fields, providing details of its action as an ambush predator. Hagler (2002) found that in laboratory trials, adults of this species strictly attack adult whiteflies, leaving eggs and nymphs alone even when all stages were abundant.

In this paper, three species are described as new to science, based on specimens collected with sweep nets in Guangdong Province of southern China. An updated key to the species of the genus from China is presented. The holotypes and some paratypes of the new species are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing; some paratypes are also deposited in the Royal Belgian Institute of Natural

Sciences (RBINS), Brussels, and the National Museum of Natural History, Smithsonian Institution (USNM), Washington, DC.

Basic terminology follows McAlpine (1981) and Cumming et al. (1995) for genitalia. The following abbreviations for setae are used: *acr*-acrostichal, *ad*-anterodorsal, *av*-anteroventral, *d*-dorsal, *dc*-dorsocentral, *npl*-notopleural, *oc*-ocellar, *pd*-posterodorsal, *ppn*-postpronotal, *psa*-postalar, *pv*-posteroventral, *sa*-supraalar, *sc*-scutellar, *v*-ventral and *vt*-vertical.

UPDATED KEY TO CHINESE SPECIES OF *DRAPETIS*

1. Thorax yellow, usually with black spots . . . 9
– Thorax black 2
2. Hindfemur entirely yellow (Guangdong) . . . . *D. nanlingensis* Yang, Gaimari, and Grootaert, 2004
– Hindfemur partly blackish or black 3
3. Hindfemur with basal third yellow 8
– Hindfemur with basal half yellow 4
4. Hindtibia blackish (Henan) . . . . *D. apiciniger* Yang, An, and Gao, 2003
– Hindtibia at most with dark brown apex . . . 5
5. First flagellomere slightly elongated (<3 times longer than wide); right epandrial lobe shallow, at most with shallow cleft on left side 7
– First flagellomere much elongated (>4 times longer than wide); right epandrial lobe wide, with wide cleft on right side . . . 6
6. Thoracic pleura entirely black; hindfemur with 1 very long basalmost *av*; left surstylus narrowing basally and with long hairs on ventral margin (Fig. 9) (Guangdong) . . . . *D. ventralis*, n. sp.
Thoracic pleura partly yellow; hindfemur lacking an elongated basalmost *av*; left surstylus wide basally and with some short hairs on ventral margin (Fig. 6) (Guangdong) . . . . *D. elongata*, n. sp.
7. First flagellomere >2.5 (2.7) times longer than wide; left surstylus obtuse apically (Guangdong) . . . . *D. guangdongensis* Yang, Gaimari, and Grootaert, 2004
First flagellomere 2 times longer than wide; left surstylus with short, fingerlike apex (Fig. 3) (Guangdong) . . . *D. digitata*, n. sp.
8. Hindtibia with 1 preapical spine; R_{4+5} and M convergent apically (Hainan, Taiwan) . . . . *D. nigrispina* Saigusa, 1965
– Hindtibia without preapical spine; R_{4+5} and M divergent apically (Taiwan) . . . . *D. femorata* Melander, 1918
9. Mesonotum with black spots 11
– Mesonotum without spots 10
10. Scutellum and postnotum yellow; thoracic pleuron entirely yellow (Yunnan) . . . . *D. abnormalis* Yang and Yang, 1990
– Scutellum brownish yellow, postnotum brown; thoracic pleuron partly brown (Yunnan) . . . *D. obtusa* Yang and Yang, 1990
11. Mesonotum with three black spots (Yunnan) . . . . *D. trimaculata* Yang and Yang, 1990
– Mesonotum with two black spots 12
12. Fore- and midtibiae and tarsi brownish yellow (Guizhou). . . . . *D. maolana* Yang and Yang, 1994
– Legs entirely yellow (Yunnan) . . . . *D. kunmingana* Yang and Yang, 1990

Drapetis digitata Yang and Grootaert, new species

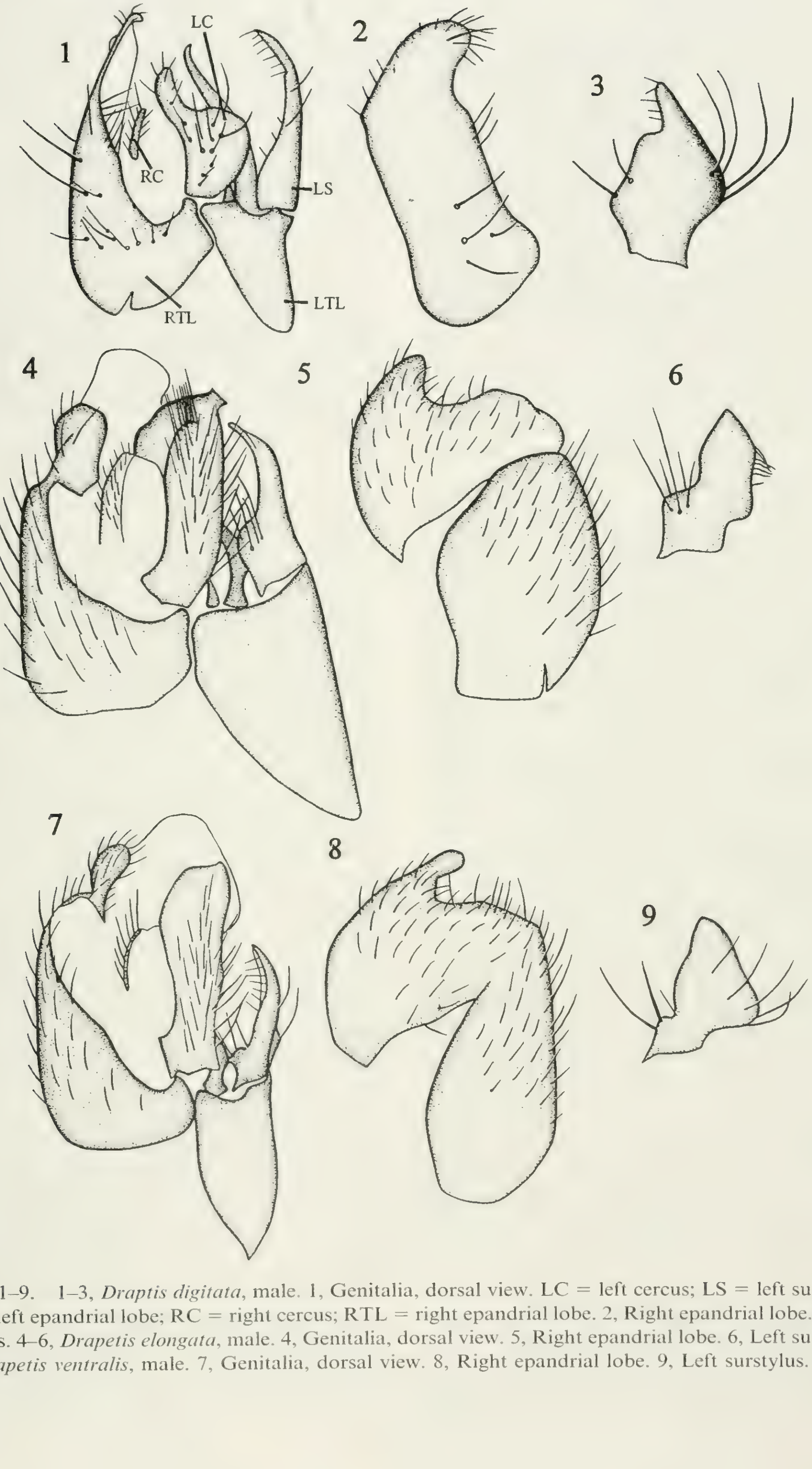
(Figs. 1–3)

Diagnosis.—1st flagellomere slightly elongated (2.0 times longer than wide). Hindfemur with apical half blackish; foretibia dark brown. Left surstylus with short, fingerlike apex.

Male.—Body length 2.9 mm, wing length 2.9 mm.

Head: Black with gray pollen; hairs and setae blackish except lower occiput with pale hairs; eyes nearly contiguous on face; ocellar tubercle with 2 long, strong *oc* and 4 short posterior hairs; 2 pairs of *vt* curved inward, outer *vt* distinctly shorter than inner *vt*. Antenna blackish; scape bare, shorter than pedicel; pedicel with circlet of black apical hairs; 1st flagellomere long, conical, 2.0 times longer than wide, short blackish pubescent; arista long (3.5 times longer than 1st flagellomere), blackish, short blackish pubescent. Proboscis dark brown with blackish hairs; palpus dark brown with blackish hairs.

Thorax: Black with thin gray pollen; pleuron subshiny; hairs and setae blackish; *ppn* absent; 2 long *npl*; 1 short *sa*; 1 long *psa*; *acr* multiseriate and not separated from *dc*; 1 long *dc*; scutellum with two pairs of *sc* (basal pair very short,



Figs. 1–9. 1–3, *Draptis digitata*, male. 1, Genitalia, dorsal view. LC = left cercus; LS = left surstylus; LTL = left epandrial lobe; RC = right cercus; RTL = right epandrial lobe. 2, Right epandrial lobe. 3, Left surstylus. 4–6, *Drapetis elongata*, male. 4, Genitalia, dorsal view. 5, Right epandrial lobe. 6, Left surstylus. 7–9, *Drapetis ventralis*, male. 7, Genitalia, dorsal view. 8, Right epandrial lobe. 9, Left surstylus.

hairlike, about 1/4 length of apical pair). Legs yellow, except hindfemur with apical half black, tibiae and tarsi brownish yellow with foretibia, extreme bases of mid- and hindtibiae, and apex of hindtibia dark brown; hairs and setae brown. Forecoxa with 6 *d*, apically with 3 setae; midcoxa with 2 outer setae, apically with 3 setae; hindcoxa with 1 outer seta. All femora weakly thickened, subequal in thickness; forefemur with one row of *av* and one row of *pv*, basalmost *pv* very long; midfemur with one row of short *pv*, basalmost *pv* very long; hindfemur with 5 short *ad* at base, one row of short *av* and one row of short *pv*. Foretibia apically with 1 long *pv*; midtibia with one row of short spinelike black *v*, apically with 1 *pv*; hindtibia apically with 1 *av*. Wing hyaline, slightly tinged with grayish; veins dark brown. Calypter dark brown with pale hairs. Halter yellow.

Abdomen: Blackish with thin gray pollen; hairs and setae blackish; tergite 1 membranous with linear sclerite; tergites 3–5 each with group of short black spines laterally, but tergites 4–5 with separated anterior portion weakly sclerotized, short pubescent, and with transverse concavity. Male genitalia (Figs. 1–3): Left epandrial lobe rather narrow basally, its surstylus somewhat quadrate with short, fingerlike apex; right epandrial lobe fused with its surstylus, much longer than wide, and with wide, obtuse apex; left cercus short and broad with fingerlike apex; right cercus very short, fingerlike.

Female.—Unknown.

Type material.—*Holotype:* ♂, China, Guangdong Province, Nanling National Nature Reserve, Mangshan, 1,300 m, 8 May 2004, Ding Yang. Deposited in CAU.

Etymology.—The name refers to the digitiform tip of the right cercus.

Remarks.—The new species is similar to *D. guangdongensis* from Guangdong, but may be separated from the latter by the short first flagellomere (2 times longer than wide). In *D. guangdongensis*, the first flagellomere is 2.7 times longer than wide (Yang et al. 2004).

Drapetis elongata **Yang and Grootaert, new species**

(Figs. 4–6)

Diagnosis.—Thoracic pleuron partly yellow. 1st flagellomere very elongated (4.3 times longer than wide). Hindfemur with apical half brownish, lacking a very long basalmost *av*; fore- and midtibiae brown, hindtibia yellow with narrow apex dark brown. Left surstylus wide basally and with some short hairs on ventral margin.

Male.—Body length 3.2 mm, wing length 3.3 mm.

Head: Black with gray pollen; hairs and setae black except lower occiput with pale hairs; eyes nearly contiguous on face; ocellar tubercle with 2 long, strong *oc* and 4 short posterior hairs; 2 pairs of *vt* curved inward, outer *vt* distinctly shorter than inner *vt*. Antenna yellow with 1st flagellomere dark brown; scape bare, shorter than pedicel; pedicel with circlet of black apical hairs; 1st flagellomere long, conical, 4.3 times longer than wide, short black pubescent; arista long (1.4 times longer than 1st flagellomere), blackish, short black pubescent. Proboscis brownish yellow with black hairs; palpus yellow with black hairs and 1 black apical seta.

Thorax: Black with thin gray pollen; mesonotum with yellow anterolateral spot; pleuron subshiny and yellow, but anepisternum with large blackish posterior spot, katepisternum with large blackish ventral spot, and metapleuron entirely black; hairs and setae pale; *ppn* absent; 2 long *npl*; 1 short *sa*; 1 long *psa*; *acr* multiseriate and not separated from *dc*; 1 long *dc*; scutellum with two pairs of *sc* (basal pair very short, hairlike, about

⅓ length of apical pair). Legs yellow, except hindfemur with apical half brownish, fore- and midtibiae brown, hindtibia with narrow apex dark brown, tarsi brownish yellow; hairs and setae blackish. Forecoxa with 4 *d*, apically with 3 setae; midcoxa with 2 outer setae, apically with 3 setae; hindcoxa with 1 outer seta. All femora weakly thickened, subequal in thickness; forefemur with one row of *av* and one row of *pv*, basalmost *pv* very long; midfemur with one row of *pv*, basalmost *pv* very long; hindfemur with 3 short *ad* at base, one row of *av* (10–11 *av* on apical half long and located closely, lacking an elongated basalmost *av*) and one row of *pv*. Foretibia apically with 1 long *pv*; mid tibia with one row of short spinelike black *v*, apically with 1 short *av*; hindtibia apically with 1 short thick *av*. Wing hyaline, slightly tinged with grayish; veins dark brown. Calypter dark brown with blackish hairs. Halter dark brown.

Abdomen: Blackish with thin gray pollen; hairs and setae black; tergite 1 membranous with very narrow striplike sclerite; tergites 3–5 enlarged, each with group of short black spines laterally, but tergite 4 with separated anterior portion distinctly sclerotized, short pubescent, and with transverse concavity and tergite 5 similarly but indistinctly sclerotized. Male genitalia (Figs. 4–6): Left epandrial lobe rather narrow basally, left surstylus wide basally and with some short hairs on ventral margin; right epandrial lobe large and more or less fused with large surstylus with small, curved apicolateral process; left cercus very long and large with obtuse apex; right cercus very short, thin, and finger-like.

Female.—Unknown.

Type material.—*Holotype:* ♂, China, Guangdong Province, Ruyuan, Nanling National Nature Reserve, Xiaohuangshan, 1,500 m, 9 May 2004, Ding Yang (CAU). Paratype: 1 ♂, Nanling National Nature Reserve, Mangshan, 1,500 m, 8 May 2004, P. Grootaert (sample 24009, in 70% ethanol, RBINS).

Etymology.—The name refers to the distinctly elongated first flagellomere.

Remarks.—The new species is very similar to *D. ventralis*, but it may be separated from *D. ventralis* by the partly yellow thoracic pleuron, the hind femur lacking an elongated *av* at its extreme base, and the left surstylus wide basally and with some short hairs on the ventral margin.

***Drapetis ventralis* Yang and Grootaert, new species**

(Figs. 7–9)

Diagnosis.—1st flagellomere very elongated (4.1 times longer than wide). Fore- and midfemur with apical ⅓ brown; hindfemur with apical half black, with basalmost *av* very long; fore- and midtibiae dark brown, hindtibia yellow with narrow apex dark brown. Left surstylus narrowing basally and with long hairs on ventral margin.

Male.—Body length 3.0–3.3 mm, wing length 3.0–3.1 mm.

Head: Black with gray pollen; hairs and setae black except lower occiput with pale hairs; eyes nearly contiguous on face; ocellar tubercle with 2 long, strong *oc* and 4 short posterior hairs; 2 pairs of *vt* curved inward, outer *vt* distinctly shorter than inner *vt*. Antenna dark yellow with 1st flagellomere brown; scape bare, shorter than pedicel; pedicel with circlet of black apical hairs; 1st flagellomere long, conical, 4.1 times longer than wide, short black pubescent; arista long (1.4 times longer than 1st flagellomere), black, short blackish pubescent. Proboscis dark brown with black hairs; palpus yellow with blackish hairs and 1 black apical seta.

Thorax: Black with thin gray pollen; pleuron subshiny; hairs and setae pale; *ppn* absent; 2 long *npl*; 1 short *sa*; 1 long *psa*; *acr* multiseriate and not separated from *dc*; 1 long *dc*; scutellum with two pairs of *sc* (basal pair very short, hairlike, about 1/4 length of apical pair). Legs yellow, except fore- and midfemora with apical 1/3 brown, hindfemur with apical half black, fore- and midtibiae dark brown, hindtibia with narrow apex dark brown, tarsi brown except hindtarsus brownish yellow; hairs and setae blackish. Forecoxa with 4 *d*, apically with 3 setae; midcoxa with 2 outer setae, apically with 3 setae; hindcoxa with 1 outer seta. All femora weakly thickened, subequal in thickness; forefemur with one row of *av* and one row of *pv*, basalmost *pv* very long; midfemur with one row of *pv*, basalmost *pv* very long; hindfemur with 3 short *ad* at base, one row of *av*, basalmost *av* very long, 5 *av* on apical ⅓ long, and one row of *pv*. Foretibia apically with 1 long *pv*; midtibia with one row of short spinelike black *v*, apically with 1 short *av*; hindtibia apically with 1 short thick *av*. Wing hyaline, slightly tinged with grayish; veins dark brown. Calypter dark yellow with brownish yellow hairs. Halter dark brown with dark yellow base.

Abdomen: Blackish with thin gray pollen; hairs and setae black; tergite 1 membranous with very narrow and striplike sclerite; tergites 3–5 enlarged, each with group of short black spines laterally, but tergites 4–5 with separated anterior portion weakly sclerotized, short pubescent, and with transverse concavity. Male genitalia (Figs. 7–9): Left epandrial lobe rather narrow basally, left surstylus narrowing basally and with long hairs on ventral margin; right epandrial lobe large and more or less fused with large surstylus with small, curved apicolateral process; left cercus very long and large with obtuse apex; right cercus very short, thin, and fingerlike.

Female.—Body length 3.3 mm, wing length 3.0 mm.

Type material.—*Holotype:* ♂, China, Guangdong Province, Ruyuan, Nanling National Nature Reserve, Xiaohuangshan, 1,500 m, 9 May 2004, Ding Yang (CAU). Paratypes: 5 ♂, same data as holotype (CAU); 1 ♂, 1 ♀, Nanling National Nature Reserve, Mangshan, 1,300 m, 8 May 2004, Ding Yang (USNM); 3 ♂, 1 ♀, Nanling National Nature Reserve, Xiaohuangshan, 1,500 m, 9 May 2004, P. Grootaert (sample 24012, in 70% ethanol, RBINS).

Etymology.—The name refers to the position of the very long anteroventral seta at the extreme base of the hind femur.

Remarks.—The new species is very similar to *D. elongata*, but it may be separated from *D. elongata* by the entirely black thoracic pleuron, the hind femur having the basalmost *av* very long, and the left surstylus narrowing basally and with long hairs on the ventral margin.

DISCUSSION

Thirteen species of the genus *Drapetis* are now known to occur in China, all of which are distributed in the Oriental part. One species is endemic to the central region of China, five are endemic to the southwestern region, and seven species are endemic to the southern region.

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